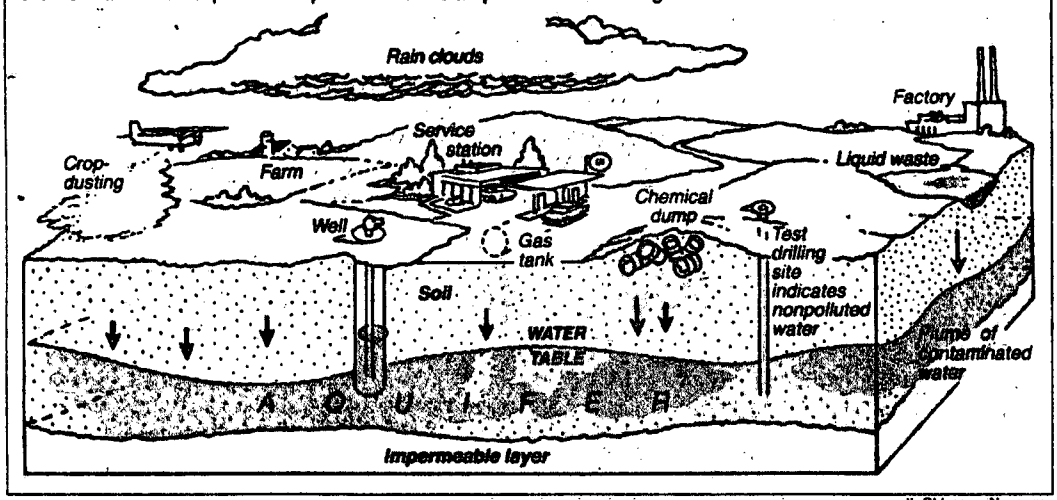
POISONING THE WELL

Ground water becomes contaminated when toxic material from pesticides, chemical dumps or buried gasoline drums reaches an aquifer. The pollution forms a "plume" that often goes undetected.



Ib Ohlsson—Newsweek

How Safe Is Your Water?

The Hawkins family lives in Moreau, N.Y., a small town near one of the nation's 51,000 toxic dumps. Cindy Hawkins, 12, has had constant headaches since she was seven and now swallows four aspirins a day. Her mother, Carole, 36, suffers from acute kidney problems and migraines; she has also had several miscarriages. This spring, when state health officials suddenly showed up to test the family's well, the Hawkinses found out that their troubles weren't a genetic curse, as they had suspected: the water was contaminated with trichloroethane, a known carcinogen.

Tales of environmental calamity have become as sadly familiar as the plots of gothic novels, but this one has a new twist. The culprit is not the fumes of a Love Canal or the gamma rays of a nuclear test, but ground water—rain and melted snow that percolated into the rocks, sand and gravel below the water table and provide drinking water for half the nation. This vast underground resource, trapped in aquifers until it bubbles out of a mountain spring or flows into wells and rivers, has become the country's most urgent environmental problem. According to former Environmental Protection Administration official Eckardt Beck, the contamination of ground water is "the environmental horror story of the '80s."

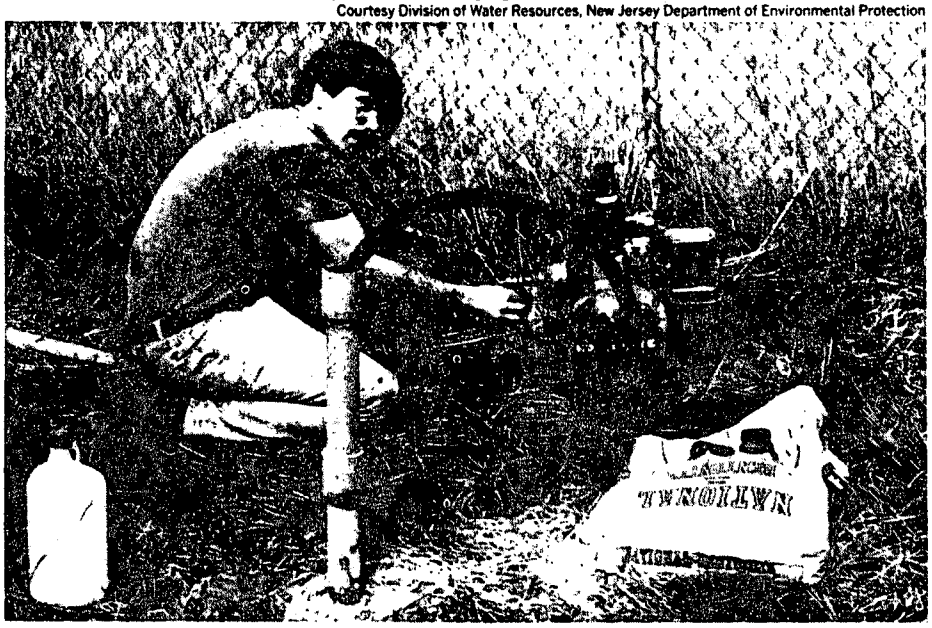
Magic: Until the mid-1970s, ground water was believed to be protected from pollution by the soil, where microbes and the soil itself scoured out traditional pollutants such as sewage. "A lot of people were doing a lot of dumping because they thought there was a magical filtration system in the ground," says Andrew Hogarth of Michigan's Department of Natural Resources. But there was no magic, because the microbes were impotent against most of the 63,000 synthetic organic chemicals now on the market. The result is that ground water has become laced with toxic chemicals in so many places that more than 2,000 wells have been shut down. That number can only climb. EPA has estimated that three-fourths of the active and abandoned chemical-waste dumps are leaking; beneath an uncounted number of filling stations, buried tanks ooze gasoline; in Florida, where the ground water in some places is only six inches below the surface, it is vulnerable to contamination even from car washes. Today, although just 1 or 2 percent of the nation's ground water is tainted, more than 5 million people are affected.

The gravity of the problem is matched only by the neglect of it. Federal regulations do not keep ground water safe. Standards are on the books for some pollutants in community supplies, but not for the dangerous organic chemicals. There are no standards at all for wells supplying fewer than 25 people. Last year researchers led by Joe Francis of Cornell University reported that two-thirds of the private wells they surveyed are tainted, most commonly with bacteria and heavy metals such as toxic lead and mercury. EPA has not released the study. "This federal agency commissioned a study, got results and then buried them," complains one scientist. "EPA is sitting on it because the study found higher levels of contamination than they thought were there." (EPA maintains they're still analyzing the discrepancy.) The states may be more willing to do something about the pollution, but they seldom have the money. "We have 200 critical sites that need to be investigated, but with only one drill we can look into just 15 a year," says Michigan's Hogarth.

A 'Plume' of Poison: Fertilizer, salts spread on icy roads, bacteria from septic tanks and salt water all leach into ground water. But the most insidious threat comes from organic chemicals, suspected of causing 5 to 20 percent of all cancers in the United States. Because pollutants come from so many sources and move about within the aquifers (chart), it is nearly impossible to guarantee that either old wells or the half-million new ones dug each year will be safe. A "plume" of poison moves as slowly as a few feet a year underground, so a chemical absent one year might show up the next. Limestone aquifers, such as the Biscayne under Miami, are lined with such labyrinthine channels that it is difficult to track

Drilling a test well in New Jersey: A tainted aquifer is almost impossible to clean

Courtesy Division of Water Resources, New Jersey Department of Environmental Protection



contaminants. Mapping is especially hard if the pollutants are heavier than water and follow deep gouges on the bottom that run counter to the main slope, like cracks running east in a sidewalk tilting south.

Dirty aquifers are much harder to clean than polluted rivers, lakes and streams. Chemicals can hide in the soil, hanging there during droughts but washing into the aquifer during wet spells. More serious, ground water is never exposed to the sunlight and air that help cleanse surface water. "Once you contaminate ground water," says Robert Harris of Princeton University, "you may contaminate it for geologic time." Aquifers are often more vulnerable to pollution, too. Without natural cleansing, they are rendered undrinkable by minute amounts of pollutants: five gallons of the ubiquitous dry-cleaning agent trichloroethylene (TCE) flushed down a septic tank can make all the well water used by 50,000 households unsafe for a year.

Pesticide: Ohio finds at least 125 polluted wells a year. Michigan turned up 440 contaminated sites in a recent survey—up 39 percent from three years ago. All three Long Island, N.Y. aquifers are tainted with chemicals, including the pesticide aldicarb, which affects the nervous system. So is almost every aquifer in New Jersey, including the one that supplied James McCarthy of Jackson Township. He had one kidney removed five years ago and now has trouble with the other; his daughter died of kidney cancer at nine months. The McCarthys attribute their tragedy to the benzene, toluene and other toxins percolating down from the municiple dump nearby. Often people don't realize that their water is polluted until the levels are high enough to taste. That's what happened to the Moats in Battle Creek, Mich. A routine test found that 14 city wells and 80 private ones, including theirs, contained carcinogenic vinyl chloride, TCE and benzene. Now the Moats drive 3 miles to get water from a pure well.

Andrew Sacks

Moat in her kitchen: Hauling the water

Not even rural areas are immune. For years farmers in California's San Joaquin Valley sprayed their tomatoes, grapes and fruit with the pesticide DBCP, subsequently found to cause sterility and cancer. They have stopped spraying, but the poison hasn't stopped infiltrating the aquifers. "Thirty-five percent of the wells in the valley have DBCP," says John Gaston of the state's health department. In Fresno County, where 250,000 people run the risk of DBCP contamination, Byron Spears died earlier this year of stomach cancer, and his wife had surgery to remove a brain tumor. The family has filed a $40 million suit against the DBCP manufacturer.

More and more aquifers previously thought safe are becoming watery Love Canals. In 1964 Velsicol Chemical Corp., a subsidiary of Northwest Industries, began dumping chemical wastes from its pesticide factory into a pit 90 miles outside Memphis. In the late '70s, the townspeople began passing out in their showers and getting nauseated from drinking their well water. A $2.5 billion suit charges Velsicol with allowing carbon tetrachloride, a known carcinogen, to leak from buried drums into the aquifer below. Princeton's Harris, a witness for the plaintiffs, maintains that Velsicol was warned by a government agency in 1967 that the drums were contaminating the water. "To continue dumping [as it did until 1978] was unconscionable," he says. Velsicol claims that it didn't know about any problems until 1978, when it closed the dump.

Pumping: Once an aquifer is contaminated, the clean-up task is as gargantuan as sweeping the Augean stables. "We have a problem that is at best extremely expensive and at worst irreversible," says Toby Clark of the Conservation Foundation. Bridgeport, N.J., is trying to remove contaminants by pumping out all the water in its polluted aquifer. No one knows how long that will take, but they've been pumping for 10 years. Homeowners can take some precautions (box), and towns can resign themselves to tainted water and try to treat what comes out of the wells. Granular activated carbon, for instance, attracts and holds chemicals in its pores; Pittsburgh's Calgon Corp. stands ready to dispatch its mobile carbon-treatment systems within 24 hours to help purify well water suddenly found to be tainted.

Most states and towns are looking for scientific and financial help from the EPA. They need standards for the organic chemicals turning up in wells and assistance in monitoring those wells. EPA may soon issue its "ground-water protection strategy," but it is expected to leave the onus for safety with the states. Groundwater now amounts to 50 times the volume of surface sources; unless someone soon takes the responsibility for keeping it clean, the United States may one day become one of those countries where you shouldn't drink the water.

SHARON BEGLEY with JOHN CAREY in New York, KIM FOLTZ in Detroit, RICHARD SANDZA in San Francisco and MARY HAGER IN Washington

Coping With Contamination

If you get drinking water from a private well, it very likely contains more than the maximum safe level of at least one pollutant. The most common contaminants are bacteria and heavy metals, but near farms, industrial areas and waste dumps, ground water can be laced with solvents, pesticides and other organic chemicals. The problem is that even badly contaminated water often looks, tastes and smells just fine, making it difficult to know what is drinkable and what is not.

The first step is to have the water tested. Local health officials are most likely to take action themselves if there are compelling reasons to suspect contamination: if the area is known to be polluted, for example, or if your family has health problems that doctors blame on the water. At the very least, they will be able to recommend a reputable testing laboratory. Analyzing for the scores of possible pollutants can cost more than $1,000, so it helps to know what to look for. Many health officers recommend annual bacteria tests and monitoring for heavy metals like lead and mercury. Near gas stations check for benzene, toluene and other petroleum components; near industry or landfills test for solvents like trichloroethylene (TCE); in farming communities look for nitrates from fertilizers and pesticides.

Filters: If the concentration of any contaminant exceeds federal drinking-water standards or if significant amounts of a chemical for which there are no standards are found, don't drink the water. Switch to bottled water or boil the water if volatile chemicals like benzene or TCE are present. Health or water-resource officials can suggest treatment options. Chlorine kills bacteria and granular carbon filters remove organic chemicals. But steer clear of faucet-mounted filters; the water passes through too quickly to be treated adequately. The filter you do install must be carefully maintained and your water inspected periodically. If contaminants are still present you should ask hydrologists to find an unpolluted area for a new well, or tap in to a public water supply.